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SCORPIONS FROM THE VIRGIN ISLANDS (ARACHNIDA, SCORPIONES)

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Three scorpion species have been reported from the U.S. Virgin Islands, but no published records exist from the British Virgin Islands.

Scorpio griseus Fabricius, 1793, originally was described from "America Insulis," and subsequently was reported from St. Thomas as *Tityus griseus* by Kock (1845). Pocock (1893:391), however, considered both nominal taxa to be "of doubtful position both generically and specifically," and indicated that "there is no apparent reason for supposing that it [*Tityus griseus* Koch] is *Scorpio griseus* of Fabricius." Kraepelin (1895, 1899), on the other hand, regarded them as conspecifics and treated *griseus* as a junior synonym of *Centruroides testaceus* (DeGeer, 1778) from Montserrat.

The original description of *S. griseus* Fabricius is so brief that even the familial position of this taxon cannot be determined with certainty. It was characterized in part as "Corpus parum, pallide testaceum, immaculatum...", whereas *T. griseus* Koch was described and illustrated as having a definite fuscous pattern. Thus, as indicated by Pocock (1893), there is no apparent reason for recognizing *S. griseus* Fabricius and *T. griseus* Koch as conspecifics. Furthermore, *S. griseus* is hereby considered a *nomen dubium* because the type specimen(s) could not be located and must be regarded as lost (Dr. Henrik Enghoff, personal communication), and the description and locality data available are insufficient to identify this taxon with any degree of assurance. Study of

the types of *T. griseus* Koch and *Centruroides testaceus* (DeGeer) [redescription in preparation] has shown that the synonymy proposed by Kraepelin (1895, 1899) is incorrect.

The second species reported from the U.S. Virgin Islands, *Centruroides dammanni* Stahnke, 1970, has St. John as its type locality. Similarities between its description and that of *T. griseus* Koch, even though written more than 100 years apart, led us to examine the possibility of synonymy between them. Study of Koch's specimen of *T. griseus* from St. Thomas, as well as numerous specimens from St. Thomas and St. John, have confirmed our initial suspicions.

The third species recorded from the Virgin Islands is *Isometrus maculatus* (DeGeer, 1778), a pantropical taxon known from St. Thomas and St. Croix (Pocock, 1893).

We have examined over 150 specimens from five islands and three cays in the U.S. Virgin Islands and from eight islands and two cays in the British Virgin Islands. Three new species are described below, and are followed by notes on synonymy, distribution, and variability of the two other species found on these islands. Repositories for type material and specimens examined are referred to in the text by institutional or personal acronyms, a key to which appears in the acknowledgments section. All measurements of specimens reported herein are in millimeters.

Family DIPLOCENTRIDAE

Heteronebo muchmorei, new species (Figs. 1-6, 12-14)

Type data.—Holotype male and allotype from West Indies Laboratory, Tague Bay, St. Croix, U.S. Virgin Islands, June 1972 (W. B. Muchmore); AMNH, New York.

Etymology.—Patronym in honor of Dr. William B. Muchmore, who collected most of the known specimens.

Distribution.—Known only from St. Croix, U.S. Virgin Islands (Fig. 1).

Diagnosis.—Adults 25-30 mm. in total length; medium brown, sparsely infuscate; pectinal tooth count on males and females 5; setation on dorsolateral carinae of metasomal segments I-IV 2:2:2:2-3; metasomal segment II wider than long, III approximately as long as wide; segment V ventral median and ventral submedian carinae strong, with medium-sized subconical granules; pedipalp femur slightly wider than deep, chela moderately carinate; tarsomere II spine formula 4/4: 4-5/5: 5/5-6: 5/6.

Description.—Measurements of holotype and allotype in Table 1. The following description is based on males; parenthetical statements refer to females.

Prosoma. Carapace medium brown with distinct dark brown variegations; shagreened (lustrous, sparsely punctate); anterior submargin smooth to vestigially granulose; anterior margin moderately emarginate, median notch rounded. Venter light yellow brown, sparsely setate.

Mesosoma. Tergites medium brown with moderately dense, medium brown variegated pattern; I-VI shagreened (lustrous). Tergite VII tetracarinate; submedian carinae present on distal one-fourth, weak, granulose; lateral carinae present on distal one-half, weak to moderate, granulose; intercarinae shagreened (smooth). Genital operculi yellow, paraboloid. Sternites light yellow brown; III-VI lustrous, vestigially punctate; stigmata small, elongate, reniform. Sternite VII acarinate, feebly punctate.

Metasoma. Medium brown. Ventral submedian carinae on I moderately strong, subcrenate, parallel; II-IV weak to moderate, subgranose, subparallel. Ventrolateral carinae on I-III weak to moderate, subgranose, subparallel to feebly convergent distally; IV moderately strong, granulose, feebly divergent distally. Lateral inframedian carinae on I-IV vestigial to obsolete. Lateral supramedian carinae on I-IV moderately strong, crenate to granulose. Dorsolateral carinae on I-IV moderate, subgranose, setation 2:2:2:2-3. Segment V longer than pedipalp femur, (less than) two times longer than wide; ventral median keel strong, granulose, ending subdistally in dense field of granules (Figs. 12-14); ventrolateral carinae strong, granulose; lateral median keels vestigial; dorsolateral carinae moderate, subgranose; dorsal submedian carinae obsolete. Telson moderately setate.

Pedipalp. Reddish brown, orthobothriotaxia C. Femur subquadangular in cross section, as wide or wider than deep; dorsointernal carina weak, granulose; dorsoexternal carina on basal one-third moderate to strong and coarsely granulose, medial one-third weak and subgranose, distal one-third obsolete; ventroexternal keel obsolete; ventrointernal keel weak, granulose; ventral face shagreened (lustrous); external face lustrous, sparsely punctate; dorsal face weakly convex, vestigially shagreened, disc with moderately dense small granulation; internal face moderately granulose. Tibia (Fig. 6): dorsointernal keel obsolete, basal tubercle vestigial; dorsal median keel weak to moderate, smooth; dorsoexternal keel weak to vestigial, smooth; external keel vestigial to

obsolete; ventroexternal keel weak to moderate, smooth; ventral median keel obsolete; ventrointernal keel moderate, smooth; internal face shagreened; ventral, dorsal, and external faces smooth, sparsely punctate. Chela (Figs. 2-5): dorsal margin rounded, smooth; digital carina moderately strong, smooth; dorsal secondary carina vestigial, smooth; external secondary carina obsolete; ventral median keel strong, smooth; ventroexternal and ventrointernal carinae obsolete; chelal faces vestigially reticulate, moderately to densely punctate. Fingers moderately setate; dentate margins granulose, without distinct pattern. Fixed finger dentate margin moderately emarginate (straight); movable finger dentate margin with matching, moderate submedian lobe (straight).

Legs. Light yellow brown, basal segments moderately infuscate. Prolateral pedal spurs moderate on all legs.

Variation.—Among the 13 specimens studied (7 males, 6 females), there is no variation in pectinal tooth counts—both sexes show five teeth on each comb. Variability in tarsomere II spine counts is slight (only one or two rows out of 26 varying by one spine), except for the prolateral row on leg II (19 rows with four spines, seven rows with five spines) and the retrolateral row on leg III (seven rows with five spines, 19 rows with six spines). The setation on the dorsolateral carinae of metasomal segments I-IV is 2:2:2:3 on all specimens from Tague Bay, 2:2:2:2 on specimens from Kingshill.

Comparisons.—*Heteronebo muchmorei* will key out to *Heteronebo vachoni* Francke, from Martinique, in the key to species published earlier (Francke, 1978). These two taxa appear to be closely related, but can be separated by the following characters. The pedipalp femur is wider than deep with the dorsal face weakly convex on *H. muchmorei*, whereas it is deeper than wide with the dorsal face moderately to strongly convex on *H. vachoni*. For males, the chela length/width ratio is greater than 1.80 in *H. muchmorei*, less than 1.80 in *H. vachoni*; for females the ratio is greater than 2.00 in *H. muchmorei*, less than 2.00 in *H. vachoni*. The ventral submedian carinae on metasomal segment I on *H. muchmorei* are moderate and subcrenate, on *H. vachoni* are weak to vestigial and smooth. Tibial trichobothria esb₁ and esb₂ are approximately equidistant on *H. muchmorei*, whereas esb₂ is distinctly basal to esb₁ on *H. vachoni*.

Specimens examined.—U.S. VIRGIN ISLANDS: St. Croix: West Indies Laboratory, Tague Bay, June 1972 (W. B. Muchmore), 1 ♂ holotype, 1 ♀ allotype (AMNH); 1 ♂, 1 ♀ (WBM); 1 ♂, 1 ♀, 9 juvs. (OFF); Kingshill, 9 May 1976 (H. Hutchins and D. Gartley), 1 ♂, 1 ♀ (BFW); St. Croix, 1971 (Nellis and McManus), 1 ♂ (AMNH).

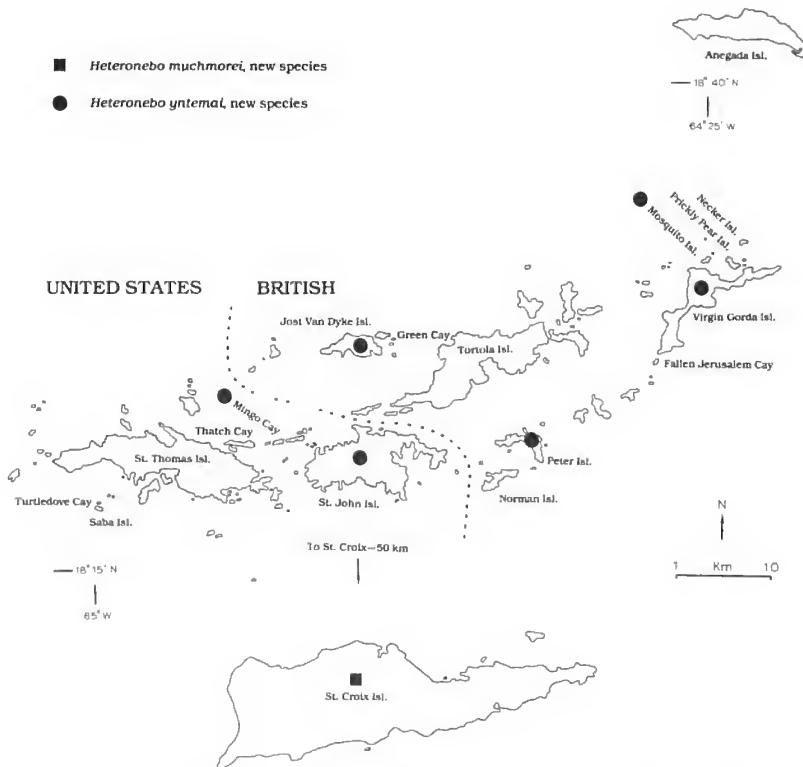


FIG. 1.—Distribution of diplocentrid scorpions in the Virgin Islands.

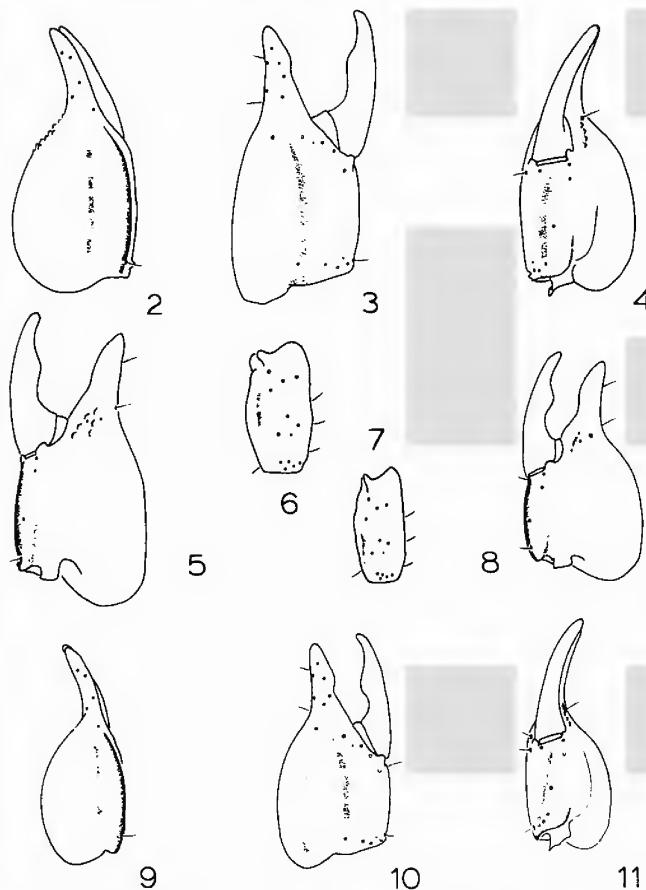
***Heteronebo yntemai*, new species
(Figs. 1, 7-11, 15-17)**

Type data.—Holotype male and allotype from Great Lameshur Bay (East Shore), St. John, U.S. Virgin Islands, 5 June 1979 (W. B. Muchmore); AMNH, New York.

Etymology.—Patronym in honor of Mr. John A. Yntema, Bureau of Fish and Wildlife, St. Croix, collector of many of the specimens used during this study.

Distribution.—This species is known from St. John Island and Mingo Cay in the U.S. Virgin Islands and from Peter, Jost Van Dyke, Virgin Gorda, and Mosquito islands in the British Virgin Islands (Fig. 1).

Diagnosis.—Adults 18-25 mm. in total length; light to medium brown, moderately infuscate; pectinal tooth count on males and females 6; setation of dorsolateral carinae of metasomal segments I-IV 1:1:1:2; metasomal segment II wider than long, III approxi-



Figs. 2-11.—Right pedipalp of male diplocentrid scorpions from the Virgin Islands. *Heteronebo muchmorei*: chela: dorsal aspect, 2; external aspect, 3; ventral aspect, 4; internal aspect, 5; tibia: external aspect, 6. *Heteronebo yntemai*: tibia: external aspect, 7; chela: internal aspect, 8; dorsal aspect, 9; external aspect, 10; ventral aspect, 11.

mately as long as wide; segment V ventral median and ventrolateral carinae strong, with medium-sized subconical granules; pedipalp femur slightly wider than deep, chela moderately carinate; tarsomere II spine formula 4/4: 4/5: 5/5-6: 5/6.

Description.—Measurements of holotype and allotype in Table 1. The following description is based on males; parenthetical statements refer to females.

Prosoma. Carapace light to medium brown with distinct dark brown variegations; shagreened (lustrous, sparsely punctate);

TABLE I.—Measurements (in millimeters) of two new species of *Heteronebo* from the Virgin Islands.

Character	<i>H. muchmorei</i>		<i>H. yntemar</i>	
	Holotype ♂	Allotype ♀	Holotype ♂	Allotype ♀
Total length	25.90	27.60	19.35	19.80
Carapace length	3.50	3.75	2.70	2.80
Mesosoma length	9.10	10.20	6.20	7.00
Metasoma length	13.30	13.65	10.45	10.00
I length/width	1.60/2.10	1.60/2.20	1.20/1.60	1.10/1.60
II length/width	1.70/1.90	1.75/2.00	1.30/1.50	1.20/1.45
III length/width	1.90/1.80	1.90/1.85	1.40/1.40	1.30/1.40
IV length/width	2.20/1.70	2.20/1.75	1.70/1.35	1.60/1.35
V length/width	3.10/1.50	3.00/1.65	2.45/1.30	2.30/1.20
Telson length	2.80	3.20	2.40	2.50
Vesicle length/width	2.10/1.50	2.60/1.80	1.90/1.30	1.95/1.35
Aculeus length	0.70	0.60	0.50	0.55
Pedipalp length	10.30	11.20	8.40	8.50
Femur length/width/depth	2.40/1.10/1.00	2.60/1.20/1.15	2.00/0.95/0.90	2.00/1.00/0.90
Tibia length/width/depth	2.50/1.20/1.10	2.70/1.25/1.15	2.20/1.00/0.95	2.20/1.10/0.95
Chela length/width/depth	5.40/2.90/1.70	5.90/2.80/1.85	4.20/2.35/1.35	4.30/2.20/1.40
Movable finger length	3.00	3.40	2.50	2.50
Fixed finger length	1.80	2.40	1.75	1.85
Chelicera length	1.65	1.80	1.20	1.25
Chela length/width	1.10/0.70	1.20/0.80	0.80/0.60	0.85/0.60
Movable finger length	0.95	0.95	0.70	0.75
Fixed finger length	0.55	0.60	0.40	0.40
Pectinal tooth count	5/5	5/5	6/6	6/6

anterior submargin smooth; anterior margin moderately emarginate, median notch rounded. Venter pale, sparsely setate.

Mesosoma. Tergites light to medium brown with moderately dense variegations; I-VI shagreened (lustrous). Tergite VII tetracarinate; submedian carinae present on distal one-fourth, weak, granulose; lateral carinae present on distal one-half weak to moderate, granulose; intercarinae shagreened (smooth). Genital operculi pale, paraboloid. Sternites pale; III-VI lustrous, vestigially punctate; stigmata small, elongate reniform. Sternite VII acarinate, feebly punctate.

Metasoma. Light to medium brown. Ventral submedian carinae on I vestigial; II-IV weak, subgranose, subparallel. Ventrolateral carinae on I-III weak, vestigially granulose, subparallel to feebly convergent distally; IV moderate, granulose, feebly divergent distally. Lateral inframedian carinae on I-IV vestigial to obsolete. Lateral supramedian carinae on I-IV moderately strong, crenate to subcrenate. Dorsolateral carinae on I-IV moderate to strong, granulose, setation 1:1:1:2. Segment V longer than pedipalp femur, less than two times longer than wide; ventral median keel strong, granulose, ending subdistally in sparse field of granules (Figs. 15-17); ventrolateral carinae strong, granulose; lateral

median keels obsolete; dorsolateral carinae weak to moderate, smooth to subgranose; dorsal submedian carinae obsolete. Telson moderately setate.

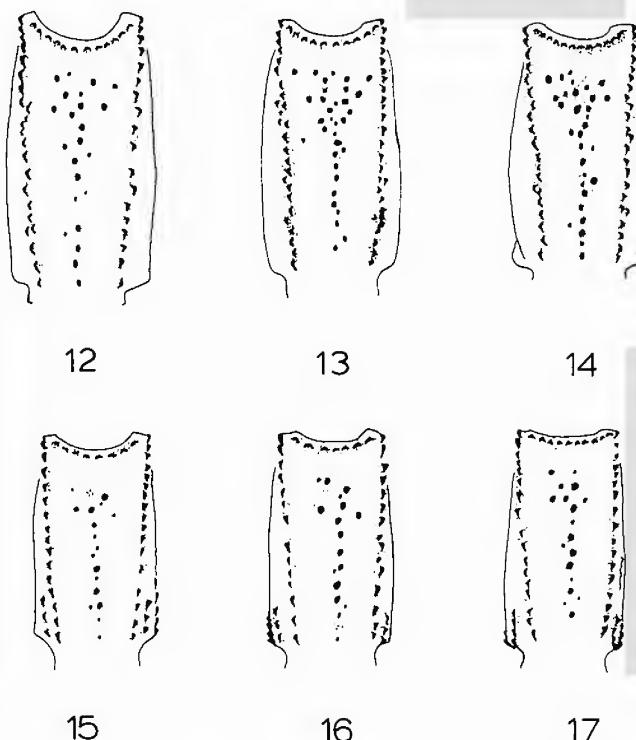
Pedipalp. Light reddish brown, orthobothriotaxia C. Femur subquadrangular in cross section, wider than deep; dorsointernal carina vestigial, with small granules; dorsoexternal carina on basal one-third moderate and granulose, medial one-third weak to vestigial and subgranose, distal one-third obsolete; ventroexternal keel obsolete; ventrointernal keel strong, granulose; ventral face shagreened (lustrous); external face lustrous, sparsely punctate; dorsal face weakly convex, vestigially shagreened, disc with sparse granulation; internal face moderately granulose. Tibia (Fig. 7): dorsointernal keel obsolete, basal tubercle vestigial; dorsal median keel weak, smooth; dorsoexternal keel weak to moderate, smooth; external keel obsolete; ventroexternal keel weak to moderate, smooth; ventral median keel obsolete; ventrointernal keel weak to moderate, smooth; internal face shagreened; ventral, dorsal, and external faces smooth, sparsely punctate. Chela (Figs. 8-11): dorsal margin subcarinate, smooth; digital carina moderately strong, smooth; dorsal secondary keel weak, smooth; external secondary carina obsolete; ventral median keel strong, smooth; ventroexternal and ventrointernal carinae obsolete; chelal faces vestigially reticulate, moderately to densely punctate. Fingers moderately setate; dentate margins granulose, without distinct pattern. Fixed finger's dentate margin moderately emarginate (straight); movable finger's dentate margin with matching, moderate submedian lobe (straight).

Legs. Yellow, basal segments moderately infuscate, distal segments sparsely infuscate. Prolateral pedal spurs moderate on all legs.

Variation.—Among the 26 specimens studied (9 males, 17 females), there is no variation in pectinal tooth counts; both sexes show six teeth on each comb. Variability in tarsomere II spine counts is slight (only one or two rows out of 52 varying by one spine), except for the retrolateral row on leg III (ten rows with five spines, 42 rows with six spines). The setation on the dorsolateral carinae of metasomal segments I-IV is 1:1:1:2 on all specimens.

Comparisons.—*Heteronebo yntemai* will key out to *H. vachoni* in the key published earlier (Francke, 1978). It appears to be closely related to both *H. vachoni* and *H. muchmorei*.

Heteronebo yntemai can be separated from *H. vachoni* by the following characters. The pedipalp femur is wider than deep with



Figs. 12-17.—Ventral aspect of fifth metasomal segment of males. *Heteronebo muchmorei*: holotype, 12; paratypes, 13-14. *Heteronebo yntemai*: holotype, 15; paratypes, 16-17.

the dorsal face weakly convex on *H. yntemai*, but is deeper than wide with the dorsal face moderately to strongly convex on *H. vachoni*. The pedipalp chela width/movable finger length ratio for *H. yntemai* is less than 1.00 for males and less than 0.90 for females, whereas for *H. vachoni* it is greater than 1.00 for males and greater than 0.90 for females. Finally, tibial trichobothria esb_1 and esb_2 are equidistant on *H. yntemai*, but subequal on *H. vachoni*.

Heteronebo yntemai can be separated from *H. muchmorei* as follows: the ventral submedian carinae on metasomal segment I are vestigial on *H. yntemai*, and moderately strong and subcrenate on *H. muchmorei*. The dorsolateral carinae on metasomal segments I-IV on *H. yntemai* have a 1:1:1:2 setation pattern, and on *H. muchmorei* a 2:2:2:2-3 pattern. The ventral median keel on metasomal segment V ends distally in a sparse field of granules on *H. yntemai* (Figs. 15-17), whereas it ends in a moderately

dense field of granules on *H. muchmorei* (Figs. 12-14). Finally, pectinal tooth counts of five on both sexes characterize *H. vachoni* and *H. muchmorei*, but *H. yntemai* has six teeth.

Specimens examined.—U.S. VIRGIN ISLANDS: St. John: Great Lameshur Bay (East Shore), 5 June 1979 (W. B. Muchmore), 1 ♂ holotype, 1 ♀ allotype, 3 ♀♀ (AMNH); Great Lameshur Bay (under rock), 9 June 1979 (W. B. Muchmore), 1 ♂ (OFF); Lameshur Bay, Gray Gut (100 ft.), 8 June 1979 (W. B. Muchmore), 1 ♂ (WBM); Little Lameshur Bay, 29 May 1979 (W. B. Muchmore), 1 ♂, 3 ♀♀, 1 juv. (WBM); Reef Bay Trail, 26 March 1970 (H., L., and F. Levi), 1 juv. (MCZ); St. John, 12 January 1971 (R. Bell), 4 ♀♀ (OFF); Mingo Cay: 14 June 1975 (V. and J. Yntema), 1 ♂, 2 ♀♀ (BFW). BRITISH VIRGIN ISLANDS: Peter Island; Little Harbor, 30 July 1976 (Ronald H. Pine), 1 ♂, 2 ♀♀ (AMNH); Jost Van Dyke Island: Roach Hill, 26 May 1975 (R. Philibosian), 1 ♀ (BFW); Virgin Gorda Island: 8 November 1974 (R. Philibosian and J. Yntema), 1 ♀ (BFW); Mosquito Island: 11 November 1974 (R. Philibosian and J. Yntema), 1 ♀ (BFW).

Family BUTHIDAE

Microtityus waeringi, new species (Figs. 18-29)

Type data.—Holotype male and allotype from Lameshur Bay, St. John, U.S. Virgin Islands (under boards in trash dump), 20 May 1979 (W. B. Muchmore); AMNH, New York.

Etymology.—Patronym in honor and memory of Dr. Erik N. Kjellesvig Waering.

Distribution.—Known from St. John and St. Thomas, U.S. Virgin Islands (Fig. 18).

Diagnosis.—Adults 12-17 mm. in total length; yellow brown with moderately dense dark brown mottling; tergites tricarinate; pectinal tooth count 10-12 (mode 11) on males, 9-11 (mode 10) on females; mesosomal sternite V on males without white bosses; basal pectinal piece of females projecting posteriorly into spatulate apophysis; pedipalps orthobothriotaxia A; pedipalp chela fingers with nine rows of granules, without supernumerary granules; prolateral and retrolateral pedal spurs well developed, tibial spurs absent.

Description.—Measurements of holotype and allotype in Table 2. The following description is based on males; parenthetical statements refer to females.

Prosoma. Carapace yellow brown with dark brown mottling, densely granulose throughout. Anterior margin moderately emarginate. Three pairs of lateral eyes. Superciliary keels moderately strong, granulose; extending anteriorly as submedian keels, moderately strong and granulose, to anterior margin. Lateral ocular

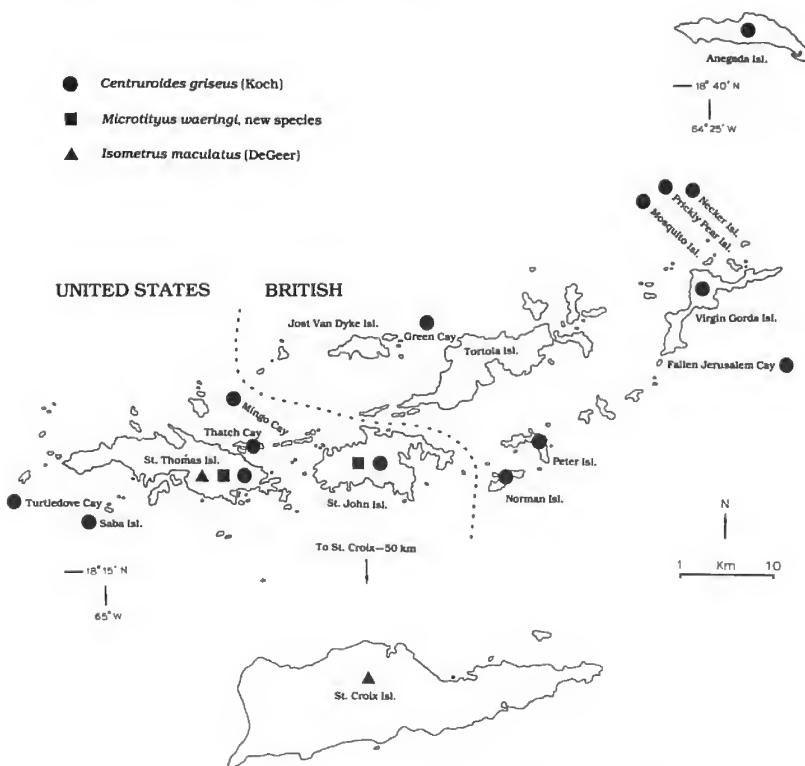
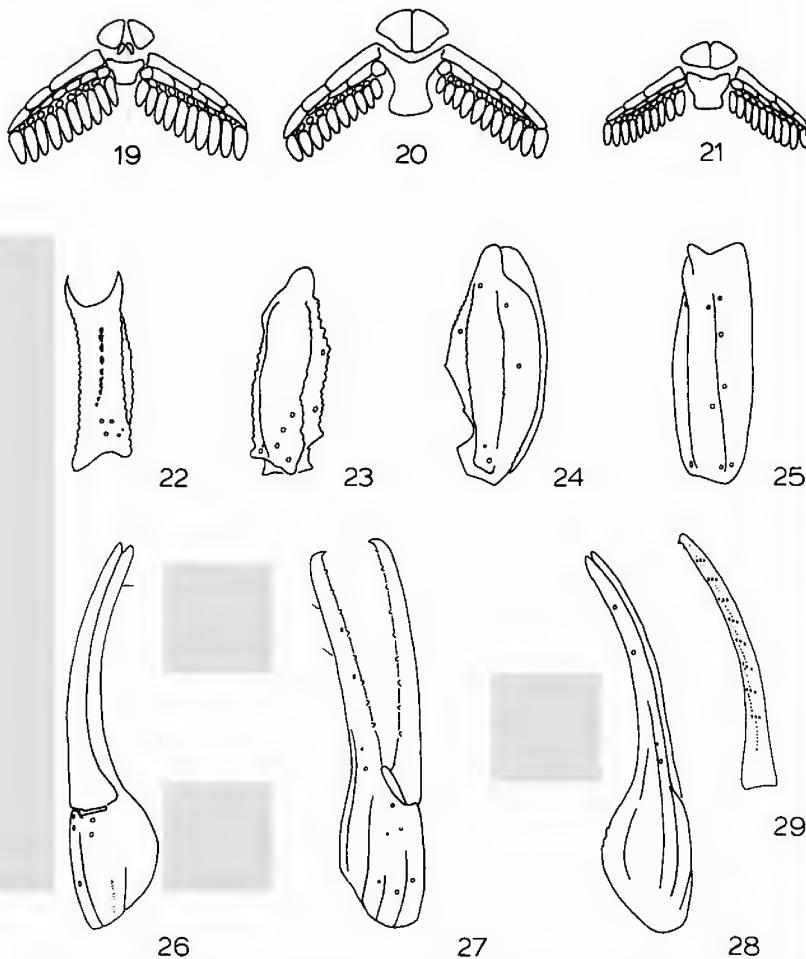


FIG. 18.—Distribution of buthid scorpions in the Virgin Islands.

carinae absent. Central submedian carinae oblique, moderately granulose. Central lateral carinae parallel, moderately granulose. Posterior submedian and posterior lateral carinae parallel, moderately strong, granulose. Venter yellow, sparsely infuscate. Sternum subpentagonal, longer than wide.

Mesosoma. Tergites yellow brown with moderately dense dark brown mottling, moderately granulose. Median and lateral carinae strong, granulose. Tergite VII pentacarinate, keels strong, granulose. Venter yellow, sparsely infuscate. Genital operculi without median longitudinal membranous connection. Genital papillae present (absent). Basal pectinal piece wider than long, see Fig. 19 (longer than wide, expanded posteriorly into a spatulate apophysis that projects over sternite III, Fig. 20). Pectines with three marginal lamellae; 4-6 middle lamellae; fulcra relatively large, subcircular; pectinal tooth count 10-12 (9-11). Sternites III-V shagreened, acarinate; VI and VII minutely granulose,



Figs. 19-29.—Pectines and pedipalps of *Microtityus waeringi*. **Pectines:** male, 19; female, 20; subadult female, 21. **Pedipalp femur:** external aspect, 22; dorsal aspect, 23. **Pedipalp tibia:** dorsal aspect, 24; external aspect, 25. **Pedipalp chela:** ventral aspect, 26; external aspect, 27; dorsal aspect, 28; dentate margin of movable finger, 29.

tetracarinate, keels moderately strong, subgranose. Stigmata small, elongate.

Metasoma. Basally yellow, gradually changing to light brown distally; moderately dense mottling throughout. Segments I-IV with ventral submedian, ventrolateral, lateral supramedian, and dorsolateral carinae strong, finely serrate. Lateral inframedian carinae on I-II strong, finely serrate; on III vestigial, on IV

TABLE 2.—*Measurements (in millimeters) of Microtityus waeringi, from St. John, U.S. Virgin Islands.*

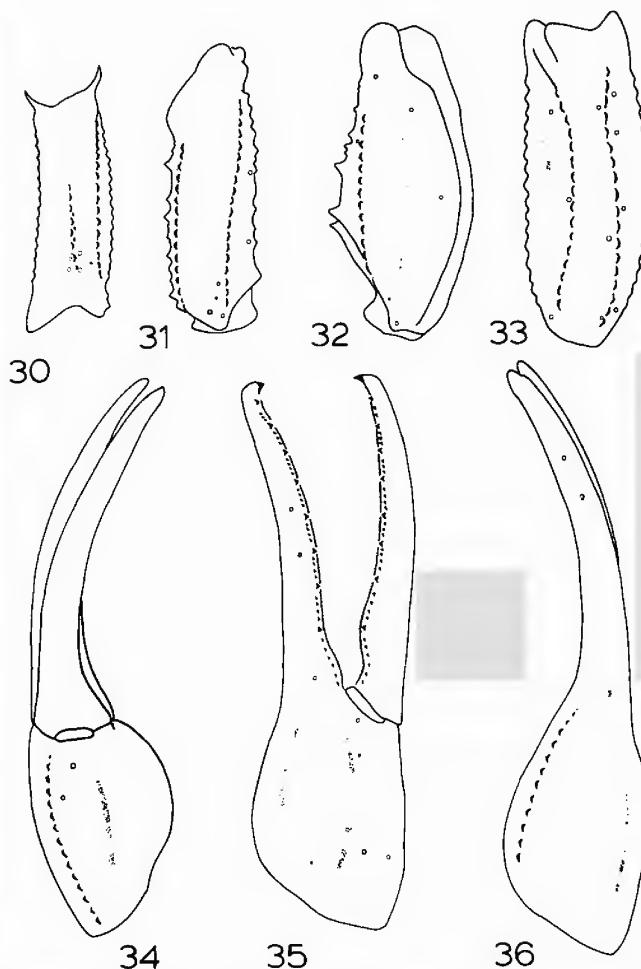
Character	Holotype ♂	Allotype ♀
Total length	13.24	15.82
Carapace length	1.71	2.06
Mesosoma length	3.66	4.80
Metasoma length	7.87	8.96
I length/width	0.86/1.00	0.94/1.14
II length/width	1.06/0.94	1.14/1.06
III length/width	1.14/0.91	1.31/1.00
IV length/width	1.43/0.86	1.60/0.97
V length/width	1.89/0.77	2.20/0.91
Telson length	1.49	1.77
Vesicle length/width	0.86/0.54	1.00/0.66
Aculeus length	0.63	0.77
Pedipalp length	5.07	6.32
Femur length/width	1.29/0.46	1.57/0.57
Tibia length/width	1.49/0.57	1.89/0.83
Chela length/width	2.29/0.51	2.86/0.69
Movable finger length	1.63	1.91
Fixed finger length	1.37	1.57
Pectinal tooth count	11-12	9-10

obsolete. Segment V with ventral median and ventrolateral carinae weak, smooth; all other carinae vestigial to obsolete. Telson medium brown, smooth, acarinate; subaculear tubercle strongly developed.

Chelicera. Cream colored, with movable finger base and distal part of chela densely infuscate. Fixed finger with one ventral denticle, movable finger with two ventral denticles.

Pedipalp. Yellow; trochanter, femur, and tibia with moderately dense dark brown mottling except ventrally; chela with manus uniformly yellow, fingers densely and uniformly infuscate on basal three-fourths, yellow apically. Femur pentacarinate, keels strong, serratogranulose; orthobothriotaxia A-beta (Figs. 22-23). Tibia heptacarinate, keels moderate to strong, serratogranulose; orthobothriotaxia A (Figs. 24-25). Chela: orthobothriotaxia A (Figs. 26-28); five moderately strong, smooth, carinae exteroventrally; three weak to vestigial, subgranulose carinae interodorsally. Movable finger with nine nonimbricated rows of granules, plus an apical set of four granules (Fig. 29). Fixed finger with nine rows of nonimbricated granules, no apical set.

Legs. Yellow brown with moderately dense dark brown mottling. Femora and patellae with strong, serrate keels. Prolateral and retrolateral pedal spurs present, tibial spur absent.



Figs. 30-36.—Adult male of *Centruroides dammanni*. Pedipalp femur: internal aspect, 30; dorsal aspect, 31. Pedipalp tibia: dorsal aspect, 32; external aspect, 33. Chela: ventral aspect, 34; external aspect, 35; dorsal aspect, 36.

Variation.—Only the following four characters were found to vary markedly:

Coloration. Immatures and adult males have yellow, unmottled manus on pedipalp chela, whereas in females they are mottled.

Basal pectinal piece. On immatures and adult males is wider than long (Fig. 19), whereas on adult females it is longer than wide (Fig. 20). The two subadult females available show an intermediate condition (Fig. 21).

Pectinal tooth counts. The number of teeth observed varies as follows for males: ten (4 combs), eleven (11 combs), and twelve (7 combs); for females: nine (4 combs), ten (25 combs), and eleven (7 combs).

Pedipalp finger dentition. The basal rows of granules on the right movable finger of the pedipalps, on one immature paratype, are fused; otherwise all specimens have nine rows of granules on both fingers. The apical set on the movable finger bears four granules on all but one specimen, which has no apical set.

Comparisons.—*Microtityus waeringi* differs from the five described species in the genus in that adult males lack white bosses on sternite V and adult females possess an exaggerated posterior expansion of the basal pectinal piece. It further differs from *Microtityus rickyi* Waering, from Trinidad, and *Microtityus biordi* Gonzales, from Venezuela, in having tricarinate rather than pentacarinate tergites, and nine instead of ten rows of granules on the fingers of the pedipalp chela. Compared to the three Cuban species in the genus (subgenus *Parvabsonus* Armas), *M. waeringi* has 11 instead of ten femoral trichobothria.

Specimens examined.—U.S. VIRGIN ISLANDS: St. John Island: Lameshur Bay (under boards in trash dump), 20 May 1979 (W. B. Muchmore), holotype ♂, allotype ♀, 1 ♂ and 1 ♀ paratotypes (AMNH); Coral Bay (under rocks), March 1978 (W. B. Muchmore), 1 ♂, 9 ♀♀ (AMNH, BFW, OFF); Lameshur Bay (under rocks), 28 May 1979 (W. B. Muchmore), 1 ♂, 1 ♀, 1 juv. (OFF); Little Lameshur Bay (under rocks), 29 May 1979 (W. B. Muchmore), 1 ♂, 1 ♀ (AMNH); Great Lameshur Bay (under rocks), 9 June 1979 (W. B. Muchmore), 1 juv. (AMNH); Little Lameshur Bay (under rocks), 9 June 1979 (W. B. Muchmore), 1 juv. (AMNH); Windberg Estate (in litter along wall), 20 May 1979 (W. B. Muchmore), 1 subadult ♀ (AMNH); Reef Bay Trail, 26 March 1970 (H., L., and F. Levi), 1 ♀ (MCZ); St. Thomas Island: July 1966 (A. M. Chickering), 1 ♂, 1 ♀, 1 subadult ♀, 3 juv. (MCZ).

Centruroides griseus (Koch), new combination
(Figs. 18, 30-36)

Tityus griseus Koch, 1845:48, plate 372, fig. 872; Pocock, 1893:391.
Centruroides dammanni Stahnke, 1970:51; Stahnke and Calos, 1977:111. New synonymy.

Type data.—Holotype male of *Tityus griseus* Koch, from St. Thomas, U.S. Virgin Islands; ZMHU, Berlin, examined. Holotype male of *Centruroides dammanni* Stahnke, from Chocolate Hole, St. John, U.S. Virgin Islands, 14 August 1968 (A. E. Dammann and H. L. Stahnke); ASU, not examined.

Distribution.—Known from four islands and three cays in the U.S. Virgin Islands, seven islands and two cays in the British Virgin Islands, and from Culebra Island (Puerto Rico) (Fig. 18).

Diagnosis.—Adult males 75-85 mm., females 60-70 mm. in total length; yellow brown with dark interocular triangle and paired submedian dark bands on tergites, other parts marbled except for pedipalp fingers which are dark brown; tergites I-VI monocarinate, VII pentacarinate with median keel moderate and submedian and lateral keels strong; sternites III-VI acarinate, VII weakly tetracarinate; pectinal tooth count in males 22-25 (mode 23), in females 19-24 (mode 22); metasoma of males longer than females; pedipalps orthobothriotaxia A (Figs. 30-36); fixed finger with 7-8 rows of denticles (mostly seven with basal rows fused), movable finger with 7-8 rows of denticles (mostly seven with basal rows fused) and a short apical set of four granules; inner and outer supernumerary granules present on both fingers; prolateral and retrolateral pedal spurs present, tibial spurs absent.

Variation.—Immatures are light yellow rather than yellow brown, have the interocular triangle densely infuscate, and two dark fuscous longitudinal bands on tergites I-VI; adults vary in the extent of fuscosity present, some retain the distinctive pattern of immatures while others show a pattern that is very faint and indistinct. As in other species of *Centruroides*, the supernumerary granules on the pedipalp fingers are absent on young instars, appearing gradually during the midinstars.

Variability in pectinal tooth counts for males shows: nine combs with 22 teeth, 24 with 23 teeth, 20 with 24 teeth, and one with 25 teeth; for females, one comb with 19 teeth, four with 20 teeth, 20 with 21 teeth, 46 with 22 teeth, 25 with 23 teeth, and four with 24 teeth.

Variability in pedipalp finger dentition (left chela analyzed) was as follows: fixed finger, 53 with 7 rows, 20 with 8 rows; movable finger, 62 with 7 rows, 11 with 8 rows; apical set on movable finger (not counted as a row): one with 3 granules, 64 with 4 granules, and eight with 5 granules.

Specimens examined.—U.S. VIRGIN ISLANDS: Little Saba Island: 18 October 1972 (J. Yntema and R. Philibosian), 1 ♂, 1 juv. (BFW); Mingo Cay: 14 June 1975 (Van and John Yntema), 1 ♀ (BFW); Saba Island: 18 October 1972 (R. Philibosian and J. Yntema), 1 ♀ (BFW); St. John Island: July 1958 (A. F. Archer), 1 ♀ (AMNH); Chocolate Hole, 1969 (A. E. Dammann), 6 ♂♂, 7 ♀♀ (VIERS); Lameshur Bay (Virgin Island Ecological Research Station), 23 September 1970 (J. Yntema), 1 ♂ (BFW); 15-24 May 1979 (W. B. Muchmore), 2 ♂♂, 2 ♀♀ (WBM), 4 ♂♂, 5 ♀♀, 3 juv. (OFF); Coral Bay, March 1978 (W. B. Muchmore), 1 ♀ (AMNH); Cinnamon Bay, March 1970 (H., L., and F. Levi), 1 ♀ (MCZ); Lind Point Trail, 22 March 1970 (H., L., and F. Levi), 1 ♂, 3 ♀♀, 35 first instars (MCZ); John's Folly, 20 March 1970 (H., L., and F. Levi), 1 ♀ (MCZ); St. Thomas Island: St. Thomas, no date (no collector), 1 ♂ holotype (ZMHU); St. Thomas,

Challenger, 03.8.15 (no collector), 2 ♀♀ (BM, old label "griseus (Koch). Fabr."); St. Thomas, no date (no collector), 3 ♀♀ (BM, old label "Centrurus testaceus C. Koch—Hamburg Mus. 98.3.6"); *Thatch Cay*: 13 June 1975 (Van and John Yntema), 1 ♀ (BFW); *Turtledove Cay*: 12 August 1977 (J. A. Yntema), 1 ♀ (BFW). BRITISH VIRGIN ISLANDS: *Anegada Island*: near airfield, 9 February 1976 (J. A. Yntema and M. Hewitt), 1 juv. (BFW); *Windlass Bight*, 9 February 1976 (J. A. Yntema and M. Hewitt), 1 ♀ (BFW); *Fallen Jerusalem Cay*: 30 October 1975 (R. Philibosian), 3 ♀♀ (BFW); *Green Cay*: 21 July 1976 (R. H. Pine), 3 ♂♂ (BFW); *Mosquito Island*: 11 November 1974 (R. Philibosian and J. Yntema), 1 ♂, 5 ♀♀ (BFW); 15 July 1976 (R. H. Pine), 2 ♀♀ (BFW); *Necker Island*: 11 November 1976 (R. Philibosian and J. Yntema), 1 ♀ (BFW); *Norman Island*: The Bight, 26 May 1975 (R. Philibosian), 2 ♀♀ (BFW); *Peter Island*: 29 June 1976 (R. H. Pine), 1 ♂, 1 ♀ (BFW); *Prickly Pear Island*: 9 November 1974 (R. Philibosian and J. Yntema), 2 ♂♂, 3 ♀♀, 1 juv. (BFW); *Virgin Gorda Island*: 8 November 1974 (R. Philibosian and J. Yntema), 1 ♀ (BFW); *Sabana Bay*, 5 September 1977 (J. Yntema), 1 ♂, 1 ♀ (BFW). PUERTO RICO: *Culebra Island*: 4 March 1906 (W. Wheeler), 1 ♀ (AMNH).

Isometrus maculatus (DeGeer)

Scorpio maculatus DeGeer, 1778:346.

Isometrus maculatus: Pocock, 1893:376; Armas, 1976:3.

Type data.—Type specimens not examined but purported to be from Surinam and Pennsylvania by DeGeer, and we presume them to be deposited at the Naturhistoriska Riksmuseet, Stockholm.

Distribution.—Pantropical. Known from St. Thomas and St. Croix in the U.S. Virgin Islands (Fig. 18).

Diagnosis.—Adult males 70-80 mm., females 45-55 mm. in total length; males with metasoma and pedipalps extremely elongate; yellow with moderately dense dark brown to black mottling and spotting, tergites with five interrupted longitudinal dark bands; tergites I-VI monocarinate, VII pentacarinate; pectinal tooth count 16-20 on both sexes; sternites III-VI acarinate, VII tetracarinate; orthobothrioxia A; pedipalp chela fingers with six rows of granules, no supernumerary granules; prolateral and retrolateral pedal spurs present, tibial spurs absent.

Remarks.—This species has been introduced by man into many areas throughout the tropics and was reported from the Virgin Islands by Pocock (1893). The scorpion catalog of the Museo di Zoologia Sistematica dell'Universita di Torino, Italy, also lists four specimens from St. Thomas.

Specimens examined.—U.S. VIRGIN ISLANDS: *St. Croix Island*: no date (A. Newton), 1 ♂ (BM: 59.72); *St. Thomas Island*: no date (no collector), 3 ♀♀ (BM: 60.22).

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LITERATURE CITED

- ARMAS, L. F. 1976. Notas sobre distribución geográfica de *Isometrus maculatus* (DeGeer) (Scorpionida, Buthidae) en las Antillas. *Misc. Zool., Acad. Cien. Cuba*, 5:3-4.
- DEGEER, CH. 1778. Mémoires pour servir à l'histoie des Insectes. Stockholm, 7(5):337-349.
- FABRICIUS, J. C. 1793. *Entomologia systematica emendata et aucta, secundum classes, ordines, genera, species adjectis synonymis, locis observationibus descriptionibus*. Hafniae, vol. 2. [Four volumes published, 1792-1796.]
- FRANCKE, O. F. 1978. Systematic revision of diplocentrid scorpions from circum-Caribbean lands (Scorpionida, Diplocentridae). *Spec. Publ. Mus., Texas Tech Univ.*, 14:1-98.
- KOCH, C. 1845. *Die Arachniden*. Nurenberg, vol. 11, 758 pp.
- KRAEPELIN, K. 1895. Nachtrag zu thiel der Revision der Skorpione. *Jahrb. Zool. Hamburg Anst.*, 12:73-96.
- . 1899. Skorpiones und Pedipalpi. *Tierreich*, 8:1-265.
- POCOCK, R. I. 1893. Contributions to our knowledge of the arthropod fauna of the West Indies. Part 1: Scorpiones and Pedipalpi; with a supplementary note upon the freshwater Decapoda of St. Vincent. *J. Zool. Linn. Soc. London*, 24:374-409.
- STAHNKE, H. L. 1970. *Centruroides dammanni*, sp. n., a new Virgin Island buthid scorpion. *J. Arizona Acad. Sci.*, 6:51-55.
- STAHNKE, H. L. AND M. CALOS. 1977. A key to the species of the genus *Centruroides* Marx (Scorpionida, Buthidae). *Entomol. News*, 88:111-120.

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